UNITED STATES PATENT AND TRADEMARK OFFICE

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10/649,636	08/28/2003	Satoshi Fukuda	520.43064X00	5550

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

DETAILED ACTION

1.   This action is issued in response to applicant's amendment filed June 22,

2006.

2.   Claims 1-20 are presented. No claims added and none cancelled.

3.   Claims 1-20 are pending.

4.   Applicant's arguments with respect to claim 1-15 have been considered

but are moot in view of the new ground(s) of rejection.   .

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and
> process of making and using it, in such full, clear, concise, and exact terms as to enable any
> person skilled in the art to which it pertains, or with which it is most nearly connected, to make
> and use the same and shall set forth the best mode contemplated by the inventor of carrying
> out his invention.

6.   Claims 2-5,9-13,and 15 are rejected under 35 U.S.C. 112, first paragraph,

as failing to comply with the enablement requirement. The claim(s) contains

subject matter, which was not described in the specification in such a way as to

enable one skilled in the art to which it pertains, or with which it is most nearly

connected, to make and/or use the invention.

Examiner is unclear of the differences between theoretical performance

value and forecasted performance value. The term 'theoretical' means either

theory or hypothesis, while the term 'forecasted' means to estimate or predict,

which seem to be analogous. While the applicant further clarifies within the

arguments presented on 6/22/2006, the information has not been provided within

the claim language in order to distinguish the two phrases. Examiner would like

to point out, the claims are read in light of the specification, however the specification is not read into the claim language. Therefore, if the applicant has specific and different meanings for the terms 'theoretical' and 'forecasted', which are pertinent to the understanding and use of the invention, more information will be needed. As a result, examiner interprets the theoretical performance value to be represented by the expected availability and the forecasted performance value to be represented by the (desired threshold – current usage).

7.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

8.   Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "volume allocation selected". Examiner is unsure as to what "selection" the applicant is referring to, since there is not prior mention of such. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which

said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 1 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalal (US Patent Application No. 20040120225) filed December 20, 2002, in view of Lowenthal (US Patent No. 6,035,306) filed November 24, 1997.

Regarding Claim 1, Dalal discloses a volume allocating method in a storage management system for managing operation of a storage device connected via a network by use of a storage management server, the volume allocating method comprising:

receiving, via the network (Fig.10, item 1019, Dalal), a condition for allocating a volume designated by a client ([0086], lines 2-19,Dalal)[1]; and

obtaining information on operation history of the volume from a memory device for storing (Fig.12, "History"; [0087], lines 1-7, Dalal), as history, information including a performance value of a disk group obtained upon actually operating the storage device ([0101], lines 10-21, Dalal). However Dalal is silent with respect to obtaining from the storage device information on specification values including a performance value of the storage device. On the other hand, Lowenthal discloses obtaining from the storage device information on specification values including a performance value of the storage device (column 7, lines 35-46, Lowenthal). Dalal and Lowenthal are analogous art because they are from

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[1] Examiner Notes: "Requirements" correspond to condition and "Obtaining from a user" corresponds to receiving by a client.

the same field of endeavor of improving performance of storage. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Lowenthal's teachings into the Dalal system. A skilled artisan would have been motivated to combine as suggested by Lowenthal at column 2, lines 30-43, in order to provide a tool for optimization of data and performance. The combination of Dalal in view Lowenthal disclose, obtaining a performance margin ([0138], lines 1-12, Dalal)[2] and using the performance margin to determine a candidate of an allocable volume ([0088], lines 1-7, Dalal) in accordance with the received condition for allocating the volume ([0086], lines 2-19,Dalal) based on the information on the operation history of the volume and the information on specification values of the storage device (column 7, lines 35-46, Lowenthal); transmitting information on the volume of the candidate to the client ([0105], lines 1-3, Dalal); receiving information on volume allocation selected and transmitted from the information on the volume of the candidate in the client ([0105], lines 3-7 and [0114], lines 15-22, Dalal); and allocating the volume to the storage device in accordance with the information on the volume allocation ([0202], lines 1-6, Dalal).

Regarding Claim 18, the combination of Dalal in view of Lowenthal, disclose a volume allocating method further comprising:

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[2] Examiner Notes: "Performance parameter" corresponds to performance margin.

displaying information including at least the performance value and

reliability corresponding to the policy (Figs.15 and 22, Dalal), an index for

selecting a memory capacity (Fig.19; [0142], lines 1-8, Dalal), and an

index for selecting the policy on the display screen of the client so as to

designate the condition for allocating the volume by the client (Fig.16;

[0139], lines 1-11, Dalal).

Claim Rejections - 35 USC § 103

11.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which
> said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

12.   Claims 2-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Dalal (US Patent Application No. 20040120225) filed

December 20, 2002, in view of Lowenthal (US Patent No. 6,035,306) filed

November 24, 1997, and further in view of Leung (US Patent Application No.

20040054656) filed August 27, 2003.

Regarding Claim 2, the combination of Dalal in view of Lowenthal,

disclose a volume allocating method further comprising:

storing previously, in the memory device, a plurality of policies

(Fig.11, item 1106, Dalal) one of which is selected by designating the

condition for allocating the volume in the client (Fig.11; [0111], lines 7-14

and [0114], lines 3-22, Dalal), including information on at least the

performance value and an operating time zone (Figs.12&13; column 10,

lines 24-37, Lowenthal). However, Dalal in view of Lowenthal, are silent

with respect to information on a forecasted performance value per unit

time which is calculated from a capacity, a theoretical performance value,

and information on the operation history of the volume of the disk group as

an allocation target. On the other hand, Leung discloses information on a

forecasted performance value per unit time which is calculated from a

capacity ([0141], lines 1-4, Leung)[3], a theoretical performance value, and

information on the operation history of the volume of the disk group as an

allocation target ([0142-0143], lines 1-5 and 1-18, Leung)[4]. The

combination of Dalal in view of Lowenthal, and further in view of Leung,

are analogous art because they are from the same field of endeavor of

management of storage environments. It would have been obvious to one

of ordinary skill in the art at the time of the invention to incorporate

Leung's teachings into the Dalal in view of Lowenthal system. A skilled

artisan would have been motivated to do so as suggested by Leung at

paragraph [0112], lines 1-12, in order to provide techniques for balancing

capacity and directly proportion the availability of the storage unit. As a

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[3] Examiner Notes: Bandwidth corresponds to capacity.
[4] Examiner Notes: Due to the 112 rejection, as stated above, examiner is also unclear of the differences between theoretical performance value and forecasted performance value. The term 'theoretical' means either theory or hypothesis, while the term 'forecasted' means to estimate or predict, which seem to be analogous. As a result, examiner interprets the theoretical performance value to be represented by the expected availability and the forecasted performance value to be represented by the (desired threshold – current usage).

result, allowing the system to move data from one storage-unit to another with ease and efficiency.

Regarding Claim 3, the combination of Dalal in view of Lowenthal, and further in view of Leung, disclose a volume allocating method wherein the step of determining the volume candidate comprises:

obtaining the performance margin ([0119], lines 6-14, Dalal) based on the theoretical performance value and the forecasted performance value per unit time of the volume included in the disk group ([0142-0143], lines 1-5 and 1-18, Leung);

calculating and subtracting the performance value designated by the policy from the obtained performance margin ([0141], lines 1-4, Leung); and

determining, as the allocation candidate, the volume of the disk group when the obtained value is positive as a result of the calculation ([0147], lines 1-13, Leung).

Regarding Claim 4, the combination of Dalal in view of Lowenthal and further in view of Leung, disclose a storage management server for managing the operation of a storage device connected via a network, the storage management server comprising:

a database for operation history (Fig.12, Dalal), which stores, as

history, information including a performance value of a disk group

obtained upon operating the storage device ([0101], lines 10-21, Dalal);

a database for a volume performance value (Fig.11, item 1004,

Dalal) which stores information on specification values (column 7, lines

35-46, Lowenthal) including performance, reliability, and a capacity of the

storage device obtained from the storage device ([0180], lines 3-16,

Dalal); and

a policy database (Fig.11, item 1006, Dalal) which stores

information on policies including the performance corresponding to a

plurality of set policies ([0114], lines 3-22, Dalal);

first processing means, which calculates a forecasted performance

value from the information on the performance value of the disk group

stored in the database for operation history ([0142-0143], lines 1-5 and 1-

18, Leung);

second processing means which obtains a performance margin

([0119], lines 6-14, Dalal), based on a theoretical performance value of the

volume and the forecasted performance value obtained by the first

processing means ([0142-0143], lines 1-5 and 1-18, Leung); and

volume determination processing means which determines an

allocation candidate ([0088], lines 1-7, Dalal) for allocating the volume in

accordance with a calculation result of the second processing means

([0147], lines 1-13, Leung).

Regarding Claim 5, the combination of Dalal in view of Lowenthal and further in view of Leung, disclose a storage management server wherein the first processing means calculates the forecasted performance value per unit time based on information on the performance value obtained from the database for operation history ([0142-0143], lines 1-5 and 1-18, Leung), and

wherein the database for a volume performance value stores information on the forecasted performance value per unit time obtained by the first processing means, corresponding to the disk group (Fig.11, item 1004, Dalal).

Regarding Claim 6, the combination of Dalal in view of Lowenthal and further in view of Leung, disclose a storage management server wherein the second processing means performs processing for obtaining a difference between the performance margin per unit time and a designated performance value stored in the policy database ([0141], lines 1-4, Leung), and

wherein the volume determination processing means determines ([0106], lines 1-3, Dalal), as the allocation candidate, the volume which is obtained by the second processing means and has a positive difference ([0147], lines 1-13, Leung).

Regarding Claim 7, the combination of Dalal in view of Lowenthal
and further in view of Leung, disclose a storage management server
further comprising:

means for transmitting information indicating a volume candidate
determined by the volume determination processing means ([0105], lines
1-3, Dalal) so as to display the information on a client connected to the
storage management server (Fig.31, item 3124, Dalal); and

means for receiving the information on the volume allocation
selected by the client in accordance with the displayed information ([0114],
lines 15-22, Dalal).

Regarding Claim 8, the combination of Dalal in view of Lowenthal
and further in view of Leung, disclose a system having a storage
management server wherein the storage management server has a client
connected thereto via the network, and wherein the client comprises:

means for designating and inputting a condition for allocating the
volume ([0086], lines 2-19, Dalal);

means for displaying (Fig.31, item 3124, Dalal) which display
information indicating the volume candidate ([0088], lines 1-7, Dalal)
determined by the volume determination processing means ([0106], lines
1-3, Dalal); and

· means for transmitting to the storage management server, the
information on the volume allocation selected from the volume information

of the allocation candidate displayed on the means for displaying ([0105],

lines 1-3, Dalal).

Regarding Claim 9, the combination of Dalal in view of Lowenthal

and further in view of Leung, disclose a program for selecting and

generating a volume candidate functioning on a storage management

server, the storage management server comprising a database on

operation history for storing, as history, information including a

performance value of a disk group obtained by operating a storage device

connected via a network, a database for a volume performance value for

storing information on specification values including performance,

reliability, and a capacity of the storage device, obtained from the storage

device, and a policy database for storing information on a policy including

the performance corresponding to a plurality of set policies, the program

for generating the volume candidate comprising:

a first processing step of calculating a forecasted performance

value from the information on the performance value of the disk group

stored in the database on the operation history ([0142-0143], lines 1-5 and

1-18, Leung);

a second processing step of obtaining a performance margin

([0119], lines 6-14, Dalal) based on a theoretical performance value of the

volume and the forecasted performance value obtained in the first

processing step ([0142-0143], lines 1-5 and 1-18, Leung);

a volume determination processing ([0106], lines 1-3, Dalal) step of

determining a candidate for allocating the volume in accordance with a

calculation result of the second processing step ([0147], lines 1-13,

Leung); and

a step of generating information for displaying a volume candidate

from information based on the volume determination processing step

([0116], lines 1-8, Dalal), so as to display the volume candidate on a client

connected to the storage management server (Fig.31, item 3124, Dalal).

Regarding Claim 10, the combination of Dalal in view of Lowenthal,

and further in view of Leung, disclose a volume allocating method further

comprising:

previously storing, in a memory device of the storage management

server, a plurality of policies (Fig.11, item 1106, Dalal) including

information on at least the performance value and the operating time zone

(Figs.12&13; column 10, lines 24-37, Lowenthal);

previously storing, in the memory device of the storage

management server, information on the forecasted performance value per

unit time calculated from information on the operation history of the

capacity, theoretical performance value, and volume of the disk group as

the allocation target ([0142-0143], lines 1-5 and 1-18, respectively,

Leung),

displaying, on a display screen of the client (Fig.31, item 3124,

Dalal), information on the plurality of policies transmitted from the storage

management server ([0116], lines 1-8, Dalal);

selecting one policy by use of input means of the client, from the

plurality of policies displayed on the display screen ([0038], lines 1-9 and

[0144], lines 2-7, Leung),

displaying, on the display screen (Fig.31, item 3124, Dalal), volume

information of the received allocated candidate ([0088], lines 1-7, Dalal);

selecting and designating one of allocated candidates displayed on

the display screen ([0148], lines 7-15, Leung);

and transmitting, to the storage management server, information on

the designated allocated candidate ([0105], lines 1-3, Dalal).

Regarding Claim 11, the combination of Dalal in view of Lowenthal

and further in view of Leung, disclose a storage management server for

managing operation of a storage device connected via a network,

comprising:

a database for operation history (Fig.12, Dalal), which stores, as

history, information including a performance value of a disk group

obtained upon operating the storage device ([0101], lines 10-21, Dalal);

a database for a volume performance value (Fig.11, item 1004,

Dalal) which stores information on specification values including a

performance value of the storage device (column 7, lines 35-46,

Lowenthal);

processing means which calculates a forecasted performance

value from the information on the performance value of the disk group

stored in the database for operation history ([0142-0143], lines 1-5 and 1-

18, Leung) and which obtains a performance margin per unit time ([0119],

lines 6-14, Dalal) based on the obtained forecasted performance value

and a theoretical performance value stored in the database for a volume

performance value ([0142-0143], lines 1-5 and 1-18, Leung);

volume determination processing means ([0106], lines 1-3, Dalal)

which determine a candidate for allocating a volume in accordance with a

calculation result of the processing means ([0147], lines 1-13, Leung); and

means for transmitting, to a client connected to the storage

management server, information indicating a volume candidate

determined by the volume determination processing means ([0105], lines

1-3, Dalal).

Regarding Claim 12, the combination of Dalal in view of Lowenthal

and further in view of Leung, disclose a storage management server

further comprising:

a policy database (Fig.11, item 1006, Dalal) which stores

information on a policy including the performance corresponding to a

plurality of set policies ([0114], lines 3-22, Dalal).

Regarding Claim 13, the combination of Dalal in view of Lowenthal

and further in view of Leung, disclose a storage management server

wherein the database for a volume performance value stores a disk group

name (Fig.17, Dalal), reliability, a capacity ([0141], lines 1-4, Leung), a

theoretical performance value, and the forecasted performance value

corresponding to the disk group ([0142-0143], lines 1-5 and 1-18, Leung).

Regarding Claim 14, the combination of Dalal in view of Lowenthal

and further in view of Leung, disclose a storage management server

wherein the database for operation history stores a disk group name

(Fig.17, Dalal) and an actual estimated performance value corresponding

to the disk group ([0142-0143], lines 1-5 and 1-18, Leung).

Regarding Claim 15, the combination of Dalal in view of Lowenthal

and further in view of Leung, disclose a storage management server

wherein the processing means comprises:

first processing means which obtain the unit time from the

designated policy (Fig.11; [0111], lines 7-14 and [0114], lines 3-22, Dalal)

and which segment the history information stored in the database on the

operation history per unit time ([0142-0143], lines 1-5 and 1-18, Leung);

second processing means which obtain an average of the

segmented data ([0119], lines 6-14, Dalal) and which obtain the

forecasted performance value ([0142-0143], lines 1-5 and 1-18, Leung);

third processing means which obtain the performance margin by

subtracting the forecasted performance value from the theoretical

performance value per unit time and which subtract the performance value

designated by the policy from the performance margin per short time

([0141], lines 1-4, Leung); and

fourth processing means, which determine whether or not the

subtracted value is positive and which determine the volume of the target

disk group if the subtracted value is positive ([0147], lines 1-13, Leung).

Regarding Claim 16, the combination of Dalal in view of Lowenthal

and further in view of Leung, disclose a storage management server

according to claim 11, wherein the client comprises:

means for receiving information for allocating the volume selected

from the received volume candidates by the client ([0114], lines 15-22,

Dalal); and

means for transmitting, to the storage device, the information for

allocating the volume received by the receiving means so as to allocate

the volume of the storage device ([0105], lines 1-3, Dalal).

Regarding Claim 17, the combination of Dalal in view of Lowenthal and further in view of Leung, disclose a system wherein the display means of the client displays the information indicating a name (Fig.17, Dalal), performance (Fig.15, Dalal), and reliability (Fig.15, Dalal) of the disk group as the volume candidate.

Regarding Claim 19, the combination of Dalal in view of Lowenthal, and further in view of Leung, disclose a volume allocating method in a storage management system, comprising:

receiving a condition on requested performance per operating time zone of a volume designated by a client (Figs.12&13; column 10, lines 24-37, Lowenthal);

referring to history information obtained from a result of actually operating disk groups (Fig.12, "History", [0087], lines 1-7, Dalal);

calculating a performance margin of the disk group upon allocating the volumes of the disk groups based on the history information (column 11, lines 23-54, Lowenthal),

obtaining a volume candidate as an allocation target from the disk groups ([0088], lines 1-7, Dalal) in accordance with a result of calculating the performance margin and presenting the volume candidate to the client ([0147], lines 1-13, Leung); and

receiving and storing one volume candidate selected by the client ([0148], lines 7-15, Leung).

Regarding Claim 20, the combination of Dalal in view of Lowenthal, and further in view of Leung, disclose a volume allocating method in a storage management system further comprising the step of:

displaying the volume candidate as the allocation target ([0088], lines 1-7, Dalal) on a display screen of the client (Fig.31, item 3124, Dalal) and selecting one volume candidate of the displayed contents ([0148], lines 7-15, Leung).

Response to Arguments

Applicant's arguments with respect to claims 1,4,9,11,and 19 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues, Dalal does not teach "the volume allocating method in a storage management system".

Examiner respectfully disagrees. In response to applicant's arguments, the recitation *"the volume allocating method in a storage management system"* has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See

In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187

F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Applicant argues, Dalal does not disclose "obtaining information on

operation history of the volume from a memory device for storing, as history,

information including a performance value of a disk group obtained upon actually

operating the storage device".

Examiner respectfully disagrees. As stated in the action above, Dalal

discloses a file at Fig.12 as an indication that "History" information is provided for

the system. To further elaborate [0121], explains the interface shown as well as the

details of the attached disks and their operational states. Examiner also cited

[0087], as an example of storage information being obtained about available

storage for user requirements. The gathering of the available storage information is

a direct reflection of the operation history, because in order to be aware of what

tasks can be performed, information is needed as to how the amount of space

provided. Also, [0101], discloses logical volumes for storage devices already

possessing physical characteristics, such as high performance. Because the

storage device "already possesses" certain characteristics and one of those

characteristics being a value for the performance further demonstrates the history

information including a performance value of a disk group.

Points of Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chelcie Daye whose telephone number is 571-272-3891. The examiner can normally be reached on M-F, 7:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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September 18, 2006

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